LCNG Fueling Station, a 'Natural' Choice

A new liquid and compressed natural gas fueling station in Fresno, California.

As the need for and acceptance of natural gas as a transportation fuel increases, the need for cost effective public access to natural gas refueling stations becomes more and more important.

The Department of Energy's Idaho National Laboratory has developed key components contributing to a Low-Cost Liquid and Compressed Natural Gas Fueling Station (LCRS) that will assist the nation's effort to improve air quality and reduce greenhouse gas emissions.

Value of LCRS

Natural gas is readily available from a low pressure pipeline system in many parts of the nation. Compressing natural gas to the pressures needed for vehicle fueling requires significant energy and equipment. Creating an equal amount of compressed natural gas (CNG) from liquid natural gas (LNG) at the conversion point only requires up to 1/20th of the energy of traditional compression. LNG is preferred to CNG in heavy transportation applications because LNG has a higher energy density that allows the vehicle to travel further on the same volume of fuel.

A fueling station can be designed to provide both LNG and CNG to meet the needs of users. LNG is easily transported to areas not served with natural gas pipelines where it can be used as a vehicle fuel or introduced into small residential pipeline grids. This INL technology allows a fuel distributor to offer natural gas, LNG and CNG, at costs approaching those for traditional gas stations.

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Science

INL

Idaho National Laboratory

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Prime Advantages

The advantages of using natural gas as a transportation fuel are well documented and include, reduced tailpipe emissions and longer engine life. However, before widespread use can occur, natural gas must be readily available to consumers at a cost comparable to that of gasoline.

The core of this technology is the function of the pumping skid. The pumping skid integrates the essential mechanical components onto one platform with the exception of the fuel storage tank. This method of construction allows the design of a station to be easily configured and re-configured depending on location and customer needs. The skid is modular in nature and allows various components to be omitted – depending on the station's intended use. The skid is manufactured in a controlled environment, and then shipped to the station site where it is connected to a power source and a storage tank.

Prime Targets

The initial target for the LCRS technology is key locations along transportation corridors that lack access to natural gas pipelines. These gaps currently prevent the effective use of natural gas vehicles to travel as desired. This technology could also be applied for transportation agencies – to augment the regional use of natural gas. The first implementation of the LCRS has been demonstrated at the South West Transportation Agency (SWTA) in Fresno California. The Southwest Transportation Agency is a State agency chartered to improve busing for several school districts in the Fresno region.

The LCRS equipment was developed through a cooperative agreement between INL and STWA. Hanover Compression Limited of Broken Arrow, Oklahoma was granted a license to develop the LCRS technology in the U.S. and Canada. It is also available in other qualifying jurisdictions.

Benefits

The benefits of this LCRS technology are that it:

- Offers a cost-effective alternative to conventional CNG stations
- Provides both LNG and CNG fueling capabilities
- Provides customer friendly user interface
- Requires less maintenance than conventional CNG stations
- Provides a stepping stone to the development of hydrogen dispensing capabilities
- Fabricates equipment under controlled conditions and is easily configured at the factory for individual customer needs
- Incorporates modular design of components to facilitate repair and maintenance and reduce problems associated with equipment obsolescence
- Allows no-vent filling of vehicles
- Provides fuel temperature compensation of dispensed LNG and CNG.

The INL is a multi-program national laboratory dedicated to supporting DOE's missions in energy and national security, environmental quality, and science.

For more information

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INL is a U.S. Department of Energy national laboratory operated by Battelle Energy Alliance

Fresno, California School District LCRS fueling station developed by INL and the South West Transportation Agency.